

# Instruction Manual

## 3-Way Ball Valve

3L66RT-DM / 3T66RT-DM

HIM-035 Version:   **B**  

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## 1. INTRODUCTION AND SAFETY INFORMATION

### 1.1 INTRODUCTION

This manual has been prepared to serve as a guide to insure continuous satisfactory service and assist in restoring a valve to proper working condition.

It covers 3 way 1000 WOG with ISO 5211 direct mounting pad, screw ends, socket/butt weld ends , and carbon steel, stainless steel ball valves.

The installation, storage, operation, inspection and repair, service problems, maintenance and preventive maintenance, quality assurance and service, technical parameters covering these valves are also included in this manual.

All these valves are widely used in water system, petroleum, chemical, power plant and allied industries.

### 1.2 SAFETY INFORMATION

The following general safety notices supplement the specific warnings and cautions appearing elsewhere in this manual. They are recommended precautions that must be understood and applied during operation and maintenance of the equipment covered herein.

- a. Always wear eye shields, gloves and overalls. Wear protective footwear and headgear.
- b. To avoid injury, never attempt disassembly while there are pressures either upstream, or downstream. Even when replacing packing rings, caution is necessary to avoid possible injury.
- c. Do not attempt to disassemble a valve while there is pressure in the line. Make sure both upstream and downstream pressures are removed. Disassemble with caution in the event all pressures have not been relieved.
- d. Prior to replacing packing rings remove all pressure from the valve.
- e. To prevent valve distortion, inefficient operation, or early maintenance problems, support piping on each side of the valve.
- f. Do not touch surface of valve on high temperature.
- g. Valves are not to be used with unstable fluids.
- h. If provided, the Locking device on the handle is to avoid improper use of the valve by unauthorized people. This can be locked with a patch lock.

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## 2. GENERAL PRECAUTIONS

### 2.1 MATERIAL SELECTION

The possibility of material deterioration in service and the need for periodic inspections is depended on the contained fluid. Carbide phase conversion to graphite, oxidation of ferrite materials, and decrease in ductility of carbon steels at low temperature (even in applications above 29°F) and susceptibility to inter-granular corrosion of austenitic materials or grain boundary attack of nickel-base alloys are among those items. Information about corrosion data is provided in this I.O.M, the user is requested to take attention or consideration to determine if the used materials are suitable for the application.

### 2.2 PRESSURE-TEMPERATURE RATING

The Pressure-Temperature rating, published by manufacturer is usually considered an appropriate guide to the maximum temperature and pressure those ball valves may withstand. The principle of pressure-temperature rating is depending on static pressure. For reference client can ask the valve distributor or manufacturer for assurance of suitability when ball valves are subjected to the following conditions:

- Valves are left closed for long periods of service under high-temperature or high-pressure service conditions
- Valves are operated frequently for long periods with high-temperature or high-pressure service conditions.

### 2.3 FLUID THERMAL EXPANSION

It is possible, with the ball in closed condition; the sealed cavity inside the valve body is filled with liquid. If this liquid is not released, by partially opening the valve, and the valve is subject to a temperature increase, excessive pressure can occur inside the body. These OVC ball valves have self-relieving pressure seats to prevent pressure built up. Our client is recommended to prevent a pressure build-up inside the valve exceeding the design pressure, by means of piping design, installation, or operation procedure.

### 2.4 DIRECT MOUNTING PAD

ISO 5211 direct mounting pad and stem orientation allows direct mounting for actuator to valves, no brackets and couplers are required, making automation a lot easier with improved performance.

### 2.5 HYDROSTATIC TEST

Before delivery, all valve body's are tested 1.5 times the working pressure in open position. After installation, the pipeline system may be subject to a system test not to exceed the above mention pressure.

**(For example: PN 16 is hydrostatic tested 1.5 X 16 = 24 bar testing pressure)**

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## 2.6 LIQUIDS WITH HIGH FLUID VELOCITY

When ball valves must be operated frequently on liquids with very high velocity, a check shall be made with the valve distributor or manufacturer for appropriate advice to minimize the possibility of seat deformation, especially when working pressure and temperature is reaching maximum ranges.

## 2.7 THROTTLING SERVICE

Standard ball valves are generally not recommended for throttling service. The fluid flow can damage the leading edge of the ball and/or damage or deform the resilient ball seats causing leakage. High fluid velocity and/or the presence of solid particles in the media will reduce the lifetime of seat and ball during throttling applications.

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### 3. STORAGE AND PREPARATION

#### 3.1 STORAGE

##### 3.1.1 Temporary Storage

If valves are to be stored before installation, the following should be observed.

- a. Keep the valves wrapped and protected as shipped from the manufacturer.
- b. Do not remove the plastic bag or protective end covering until the valve is ready for installation. This will reduce the possibility of foreign material damaging internal valve components.
- c. Valves stored outdoors should be positioned such that water dose not accumulate in the valve body.

##### 3.1.2 Long Term Storage

If the valves are to be stored more than of one year, they should be prepared in the following manner.

- a. Remove the packing and apply a preservative to the packing chamber.
- b. Do not remove the protective end covering.
- c. Valve which will remain in storage for an excessive period of time should have a preservative applied to the external surface.
- d. Do not store the valves outdoors.

#### 3.2 PREPARATION

- a. Remove the plastic bag or valve end protection (if any).
- b. Prior to shipment from the manufacturer, a preservative may have been applied to the inner body of the valve. This preservative maybe removed with a solvent.
- c. The inside of the valve should be inspected and blown out with compressed air. Adjacent piping must be clean and free from debris to prevent damage to the valve.
- d. To prevent valve distortion, inefficient operation or early maintenance problems, support piping on each side of the valve.
- e. Make sure the valve is positioned such that there is sufficient space so that the handle is easily and safely reached.
- f. The 3-way ball valves can be installed in any position without regard for the direction of the flow, unless marked in the flow direction.
- g. The 3-way ball valves are not designed for throttling and should be kept in the fully open or closed position. Should the valve be used in a partially open or closed position, the ball and seats may become eroded in a very short time. This may also cause a chatter noise in the line.

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## 4. INSTALLATION

### 4.1 HANDLING

Make sure that the used lifting equipment is strong enough to ensure a safe installation.

### 4.2 CLEANING

Before the valves are installed make sure that they are clean(ed) inside and outside. Make sure that the valves are free of dust and sand. You can clean the valves with drinking water, compressed air, or steam. Please take caution with the cleaning of automated valves that no water or steam will enter the actuator..

### 4.3 MANUAL OPERATION

The basic type of handle which is fitted to all sizes of valve is sheet steel with integral stop. 3-Way ball valves have 1/4 turn operation closing in a counter-clockwise direction. Table 1 is the flow direction of the L port and T port.

PORT TYPE \	1	2	3	4
L				
T				

Table 1 - Flow Patterns for 3-Way ball Valve

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## 5. MAINTENANCE AND REPAIR

### 5.1 MAINTENANCE DURING THE OPERATION

Leakage may occur to the product after a certain period of operation; maintenance shall be performed as follows:

#### 5.1.1 Leaking from the stem packing

**Causes:** Prolonged or frequent use makes the stem packing gradually lose its elasticity, resulting in weakened sealing effect in the stem, and finally leakage.

**Remedial measures:** Remove the handle and handle head; Adequately tighten the fixing stem nut with a proper wrench, so that the gland presses tightly on the stem packing and cause new elastic deformation of the packing material so as to grab tighter onto the stem, thus stopping the leak. This procedure may be performed regularly.

#### 5.1.2 Leaking between valve body and valve cap

**Causes:** After a period of operation, the tightening force between the valve body and valve cap becomes weaker, resulting in less pressure against the gasket and therefore the leak.

**Remedial measures:** Adequately tighten the bolts connecting the cap to the body with a proper wrench, so as to enhance the sealing effect of the gasket between the cap and the body by increasing the pressure, and therefore stopping the leak. This procedure may be performed regularly.

#### 5.1.3 Leaking from the Valve Seat

**Causes:**

A. After long-term valve operation and endurance of force, the resilience of the ball seat weakens, resulting in decreased pressure against the ball, thus leading to leakage.

**Remedial measures:** See (5.1.2)

B. After long-term valve operation and endurance of force, the ball seat or the ball gets scratched and therefore leakage occurs.

**Remedial measures:** See (5.2.3)

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## 5.2 REPAIR

After a certain period of operation, if the product still leaks after abovementioned maintenance, repair shall be performed as follows:

### 5.2.1 Repair the leaking stem packing

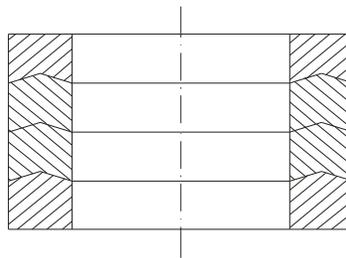
Method: Replace stem packing.

Dismantle:

- a. Remove the handle and handle nut.
- b. Then remove the stem nut with the proper tool.
- c. Remove gland.
- d. Take out stem packing with a proper tool.

Assembly:

- a. Correctly arrange the four (upper, middle, lower) pieces of new gland packing.
- b. Place the packing onto the stem; mind the direction.



- c. Place the cap-c and tighten it.

### 5.2.2 Repairing the leak at the body-cap joint

Method: replace the gasket

Dismantle:

- a. Remove stud bolts joining the body and cap.
- b. Remove the gasket.

Assembly:

- a. Place the new gasket in position; ensure that the gasket is smoothly placed.
- b. Place the cap onto the body and tighten the stud bolts.

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5.2.3 Repair the leak at the valve seat

Method: Replace the ball seat; polish or replace the ball body.

Dismantle:

- a. Remove the stud bolts joining the body and cap.
- b. Remove the ball.
- c. Remove the seat that leaks.

Assembly:

- a. Place the new seat in position; ensure that the seat is smoothly placed.
- b. Place the cap onto the body and tighten the stud bolts.

Inspection and treatment:

Inspect the surface of the ball. Polish the ball if there are fine scratches or roughness. Replace with a new ball if the scratch is severe.



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## 6. QUALITY ASSURANCE AND SERVICE

### 6.1 QUALITY ASSURANCE

OVC's warrants its products to be free from defects in material and workmanship for a period of eighteen (18) months from the date of shipment or twelve (12) months from the date of installation whichever comes first. This warranty is limited to the repair or replacement of the defective item providing that it was handled, installed, used and maintained in accordance with the manufacturer's recommendations and applicable standard industry practices. OVC will not be liable for any additional direct or indirect costs beyond the repair or replacement of the defective item.

This warranty is in lieu of any other warranty expressed or implied.

### 6.2 SERVICE

Manufacturer may provide field installation and debugging where contractually specified.

Manufacturer will follow up the quality of the valve provided and offer service in accordance with customer requirements.

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## 7. TECHNICAL PARAMETERS AND VALVE STRUCTURE

### 7.1 SPECIFICATION LIST

Type	3L66RT-DM / 3T66RT-DM
Technical Parameters	
Nominal pressure	1000 WOG
Working temperature	-20°C ~ 200°C, (-4°F ~ 392°F)
Medium	Water, Steam, Oxygen, Vacuum, Chemical, Oil, Food Processing
Pressure test	API 598

Table 2 - Specification List

### 7.2 TORQUE

NPS	DN	Breaking torque		Stem Nut	
		N-m	in-lb	N-m	in-lb
1/4"	8	9	79.66	5	44.25
3/8"	10	9	79.66	5	44.25
1/2"	15	12.6	111.52	5	44.25
3/4"	20	16.2	143.38	5	44.25
1"	25	20.2	178.78	7	61.95
1-1/4"	32	25.8	228.35	7	61.95
1-1/2"	40	37.8	334.56	12	106.21
2"	50	63.6	562.9	12	106.21

Table 3 – Torque



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### 7.3 PRESSURE-TEMPERATURE RATINGS

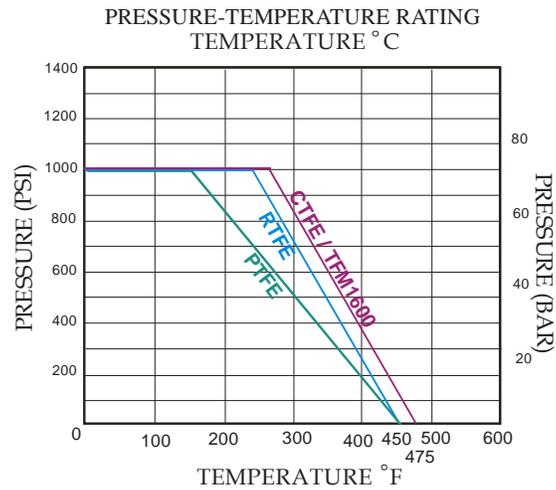


Table 4 - Pressure-Temperature Ratings

### 7.4 VALVE STRUCTURE

